

Attorney Docket No.: 121657-3/11944 (21635-0090-1)
Application No.: 10/758,381

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C) Remarks/Arguments

This application has been reviewed in light of the Office Action of October 22, 2004. Claims 12-18 are pending, and all claims are rejected. In response, the Specification is amended; claims 15-16 are amended, new claims 19-25 are added, and the following remarks are submitted. Reconsideration of this application is requested.

The Specification is amended to insert the patent number of the parent application.

Claims 15-16 are amended to correct antecedent basis errors, and not in response to any prior art rejection.

Claims 12-17 are rejected under 35 USC 103 over Moore US Pub. 2003/0161946 in view of Knight et al. Article. Applicant traverses this ground of rejection.

The following principle of law applies to all sec. 103 rejections. MPEP 2143.03 provides "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the applied prior art references clearly do not arguably teach some limitations of the claims.

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Claim 12 recites in part:

"measuring a flow rate of the fuel to the deposition gun, a flow rate of the oxidizer to the deposition gun, a flow rate of the powder to the deposition gun, and a cooling capacity of the coolant flow;"

Moore has no teaching of this limitation, see last paragraph on page 3 of the Office Action. The explanation of the rejection asserts (page 4, first paragraph, and paragraph bridging pages 4-5) that Knight Article teaches this limitation. Applicant respectfully traverses this assertion. Knight teaches that certain parameters may be variables, but says nothing about them being "important" or that they should be measured (second full paragraph in right hand column on page 159). There is no teaching on page 159 that fuel flow rate and oxygen flow rate are even of interest (only the ratio is mentioned).

More to the point, in the paragraph immediately below Table I on page 160, Knight Article identifies the "three key spray parameters: surface speed of the part, spray distance, and fuel:oxygen ratio" that are varied. The Knight Article states "all other parameters were fixed at the baseline values" (page 160, first paragraph after Table I). No mention is made of flow rates of fuel, oxidizer, and powder, and cooling capacity as being important variables, and in fact the teaching is that they are kept fixed at the baseline values. Nor is any mention made of "measuring" these quantities during operation of the HVOF apparatus. As Table I states, the manufacturer's "recommended" operating parameters, except for the "three key spray parameters", were used as input control parameters.

Claim 12 further recites in part:

"set-point controlling the flow rate of the fuel, the flow rate of the oxidizer, the flow rate of the powder, and the cooling capacity of the coolant flow, all responsive to the step of measuring".

Neither reference has any such teaching. Moore teaches using a feedback controller, and mentions parameters that may be used as the basis for the feedback control: variations in temperature, fluctuations in coating process parameters, and

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fluctuations in the coating process parameters. There is no mention of flow rates of fuel or oxidizer, flow rate of powder, or cooling capacity.

Neither reference points the way to the measurement and active control of the parameters recited in the present claims.

Para. [0029] of the present approach presents a direct experimental comparison between the present approach and the closest prior art. The present approach produced surprising and unexpected improvements in the performance of the sprayed coatings.

Regarding claims 13-14, these claims recite "measuring" coolant temperature and coolant flow rate, respectively, and neither reference has any such teaching.

The limitations of claim 15 are not taught by either reference, and the only mention of this claim in the explanation of the rejection is an acknowledgement that Moore fails to teach the limitations of claim 15. See Office Action at page 3, last line. If the rejection is maintained, Applicant asks that the Examiner point out the location in the references where its limitations are said to be taught.

Claim 16 recites providing an instrumentation array for measuring specific quantities. Neither reference has a teaching of such an instrumentation array. Para. [0034] of Moore has no mention of measuring any of the quantities recited in claim 16.

Claim 17 recites automatic control of four parameters responsive to their measured values. Para. [0034] of Moore does not mention any of these parameters.

The present rejection is a sec. 103 combination rejection. It is well established that a proper sec. 103 combination rejection requires more than just finding teachings in the references of the elements recited in the claim (but which was not done here). To reach a proper teaching of an article or process through a combination of references, there must be stated an objective motivation to combine the teachings of the references, not a hindsight rationalization in light of the disclosure of the specification being examined. MPEP 2143 and 2143.01. See also, for example, In re Fine, 5 USPQ2d 1596, 1598 (at headnote 1) (Fed.Cir. 1988), In re Laskowski, 10 USPQ2d 1397, 1398 (Fed.Cir. 1989), W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 311-313 (Fed. Cir., 1983), and Ex parte Levengood, 28 USPQ2d 1300 (Board of Appeals and Interferences, 1993); Ex parte Chicago

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Rawhide Manufacturing Co., 223 USPQ 351 (Board of Appeals 1984). As stated in In re Fine at 5 USPQ2d 1598:

"The PTO has the burden under section 103 to establish a prima facie case of obviousness. [citation omitted] It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references."

And, at 5 USPQ2d 1600:

"One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

Following this authority, the MPEP states that the examiner must provide such an objective basis for combining the teachings of the applied prior art. In constructing such rejections, MPEP 2143.01 provides specific instructions as to what must be shown in order to extract specific teachings from the individual references:

"Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention when there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992)."

* * * * *

"The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)."

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"A statement that modifications of the prior art to meet the claimed invention would have been 'well within the ordinary skill of the art at the time the claimed invention was made' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. Ex parte Levengood, 28 USPQ2d 1300 (Bd.Pat.App.& Inter. 1993)."

Here, there is set forth no objective basis for combining the teachings of the references in the manner used by this rejection, and selecting the helpful portions from each reference while ignoring the unhelpful portions. An objective basis is one set forth in the art or which can be established by a declaration, not one that can be developed in light of the present disclosure. If the rejection is maintained, Applicant asks that the Examiner set forth the objective basis found in the references themselves for combining the teachings of the references, and for adopting only the helpful teachings of each reference and disregarding the unhelpful teachings of the reference.

The paragraph bridging pages 4-5 of the Office Action presents a rationale for measuring and controlling various parameters, but in fact neither reference teaches measurement of these parameters during operation and control of the deposition apparatus. As noted above, Moore lists some parameters of interest, but not those recited in the present claims. The explanation of the rejection 3-4 lines from the bottom of page 4 of the Office Action asserts that "Knight Article teaches that desirable feature to control...", but in fact Knight Article sets those values at the recommended values of the manufacturer of the apparatus, and does not control or vary them at all, while intentionally varying the different "three key spray parameters". If anything, Knight Article teaches directly away from the present approach. The whole point of the present approach is that using the recited parameters provided by the manufacturer is not satisfactory, see the comparative results of para. [0029] of the present application.

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But even if the teachings are improperly combined, Moore and Knight Article do not reach the recited claim limitations. Moore does not mention measuring and controlling the parameters recited in the present claims, and instead directs attention to other parameters. The Knight Article teaches that the parameters recited in the present claims are kept fixed at baseline values, to the extent that these parameters are addressed.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

Claim 18 is rejected under 35 USC 103 over Moore in view of Knight Article, and further in view of Nakagawa US 5,958,522. Applicant traverses this ground of rejection.

Claim 18 depends from claim 12, whose limitations are not taught by the combination of Moore and Knight Article for the reasons discussed above and which are incorporated here. Nakagawa adds nothing in this regard.

Moore has no teaching that its approach is operable with hydrogen/oxygen. Knight Article specifically teaches away from the use of hydrogen/oxygen, instead teaching the use of propylene/oxygen (Table I). Thus, the only conclusion is that the combination of the teachings of Moore and Knight Article is to use propylene/oxygen.

The explanation of the rejection thus asserts that it would be obvious to substitute hydrogen/oxygen of Nakagawa for propylene/oxygen of Moore/Knight Article. Nothing suggests that propylene/oxygen is not operable and fully functional in the combined teachings of Moore and Knight Article, and achieves just as good results as obtained by Nakagawa. In fact the combination of Moore and Knight Article teaches that propylene/oxygen produces good coatings, see page 163 of Knight Article, right hand column, under Conclusions and Recommendations. There is no reason to substitute hydrogen/oxygen from Nakagawa into the combined teachings of Moore and Knight Article. Further, the flow rate of fuel to oxidizer in the combined teachings of Moore and Knight is fixed at 64/472 or about 0.14, well outside the fuel to oxidizer range of 2.2-2.6 recited in Applicant's claims.

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It also appears that Nakagawa does not contemplate the use of "a deposition gun that burns a mixture of a fuel and an oxidizer to form a deposition gas flow, mixes a powder into the deposition gas flow to form a deposition mixture flow, and projects the deposition mixture flow therefrom," as recited in claim 12 and thence in claim 18. The device pictured in Figure 1 of Nakagawa is not of this type, so the relevance of Nakagawa's teachings in any event is unclear.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

Claims 12-17 are rejected under 35 USC 103 over Knight Article in view of Packer US Patent 4,613,259. Applicant traverses this ground of rejection.

Applicant incorporates the discussion of the Moore/Knight Article rejection of these same claims, as many of the issues are the same.

As discussed earlier, Knight Article teaches that "three key spray parameters--surface speed of the part, spray distance, and fuel:oxygen ratio" are varied, and that "all other parameters" are "fixed at the baseline values" established by the manufacturer of the deposition apparatus. These parameters that are fixed at the baseline values include fuel flow rate, oxygen flow rate, and powder feed rate. See Table I and the next following paragraph on page 160 of Knight Article. Coolant flow is also presumably fixed as well, since it is not one of the "three key spray parameters" that is varied.

As far as Applicant can determine, Packer teaches that four parameters may be monitored and controlled: carrier gas flow, powder flow, substrate temperature, and substrate relative position. (If the Examiner is aware that Packer teaches the monitoring and controlling of any other parameters and any rejection on Packer is maintained, Applicant asks that the location of such teaching be set out in the next office action.) There is no teaching or even mention of fuel flow or oxygen flow. Accordingly, the only teaching that can be drawn from the combination of Knight Article and Packer is that stated by Knight Article, namely that fuel flow and oxygen flow are constant. Packer does not mention coolant flow, and the only teaching that can be drawn from the combination is that implied by the Knight Article, that coolant flow is constant. Packer does teach that powder feed rate may be monitored and

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controlled. However, this teaching is inconsistent with the teaching of Knight Article, that the power feed rate is constant. There is no basis for adopting the teaching of Packer over that of Knight Article in regard to the powder feed rate. Packer's teaching of monitoring and controlling substrate temperature and substrate relative position is not pertinent to the present claims.

The explanation of the rejection asserts that it would be obvious to modify the teachings of the Knight Article "to specifically monitor and control the flow rate of the fuel, oxidizer, and powder, and the flow rate and temperature of the coolant flow as suggested by Packer..." Applicant respectfully disagrees. Packer does not mention controlling the flow rates of fuel, oxidizer, and/or coolant, or the temperature of the coolant. There is no point to measuring these quantities and providing a responsive controller for these quantities if they are not to be controlled and must be fixed according to the Knight Article. Packer does mention controlling the flow rate of powder, but that is specifically contrary to the explicit teaching of the Knight Article that the flow rate of the powder is fixed at the baseline values.

The explanation of the rejection asserts that it is "well known to make adjustments..." (Office Action, page 8, lines 6-7) Applicant traverses this assertion, to the extent that it is intended to go beyond the teachings of the applied references. "Well known" is not a class of statutory prior art recognized in 35 USC 102 or 35 USC 103. Applicant traverses this substitution of asserted "well known" prior art for a statutory prior art reference as applied in the context of the claim. Here, the matters asserted to be "well known" are not, in this context, beyond what is taught in the applied prior art. Applicant requests that, if the rejection is maintained and the extent of "well known" is intended to go beyond what is taught by the applied references, the Examiner apply a further statutory prior art reference in support of the "well known" art and set forth a rejection that incorporates the statutory prior art. MPEP 2144.03. Absent such an application of statutory prior art in the statement of the rejection, Applicant will take it that the "well known" prior art does not extend beyond that taught by the applied references.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

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Claim 18 is rejected under 35 USC 103 over Knight Article in view of Packer, and further in view of Nakagawa. Applicant traverses this ground of rejection.

Applicant incorporates the discussion of each of the prior rejections, as each has some points pertinent to the response to this rejection.

Knight Article in view of Packer does not teach the limitations of claim 12, from which claim 18 depends. Nakagawa adds nothing in this regard.

Knight Article specifically teaches away from the use of hydrogen/oxygen, instead teaching the use of propylene/oxygen (Table I). Packer does not teach that its approach is operable with hydrogen/oxygen. Thus, the only conclusion is that the combination of the teachings of Knight Article and Packer is to use propylene/oxygen.

The explanation of the rejection thus asserts that it would be obvious to substitute hydrogen/oxygen of Nakagawa for propylene/oxygen of Knight Article/Packer. Nothing suggests that propylene/oxygen is not operable and fully functional in the combined teachings of Knight Article and Packer, and achieves just as good results as obtained by Nakagawa. In fact the combination of Knight Article and Packer teaches that propylene/oxygen produces good coatings, see page 163 of Knight Article, right hand column, under Conclusions and Recommendations. There is no reason to substitute hydrogen/oxygen from Nakagawa into the combined teachings of Knight Article and Packer. Further, the flow rate of fuel to oxidizer in the combined teachings of Knight and Packer is fixed at 64/472 or about 0.14, well outside the fuel to oxidizer range of 2.2-2.6 recited in Applicant's claims.

It also appears that Nakagawa does not contemplate the use of "a deposition gun that burns a mixture of a fuel and an oxidizer to form a deposition gas flow, mixes a powder into the deposition gas flow to form a deposition mixture flow, and projects the deposition mixture flow therefrom," as recited in claim 12 and thence in claim 18. The device pictured in Figure 1 of Nakagawa is not of this type, so the relevance of Nakagawa's teachings in any event are unclear.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

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Applicant submits that the application is now in condition for allowance, and requests such allowance.

D) CONCLUSION

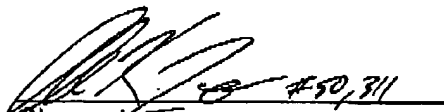
In view of the above, Applicant respectfully requests reconsideration of the Application and withdrawal of the outstanding objections and rejections. As a result of the amendments and remarks presented herein, Applicant respectfully submits that claims 12-25 are not anticipated by nor rendered obvious by Knight, Nakagawa, Packer or their combination and thus, are in condition for allowance. As the claims are not anticipated by nor rendered obvious in view of the applied art, Applicant requests allowance of claims 12-25 in a timely manner. If the Examiner believes that prosecution of this Application could be expedited by a telephone conference, the Examiner is encouraged to contact the Applicant.

This Amendment/Response has been filed within three (3) months of the mailing date of the Office Action and it is believed that no fees are due with the filing of this paper. In the event that Applicants are mistaken in their calculations, the Commissioner is hereby authorized to deduct any fees determined by the Patent Office to be due from the undersigned's Deposit Account No. 50-1059.

Dated: January 21, 2005

Respectfully submitted,
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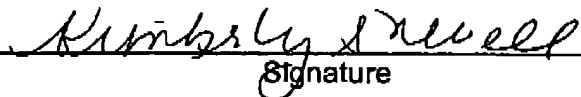
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Filed: January 15, 2004

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